

REMARKS

Reconsideration and withdrawal of the rejections set forth in the above-mentioned Official Action in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1-10 are now pending in this application, with Claims 1-10 being independent. Claims 1-8 have been amended and Claims 9 and 10 are newly-presented herein.

Claims 1 and 2 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,084,619 (Takemoto et al.) in view of U.S. Patent Application Publication No. 2002/0041310 (Kaneko et al.) and U.S. Patent No. 6,494,569 (Koitabashi et al.). Claims 3-8 were rejected under § 103 as being unpatentable over Koitabashi et al. in view of Kaneko et al. These rejections are respectfully traversed.

As recited in certain independent claims, a pigment ink having a surface tension lower than that of a reaction liquid is ejected to the reaction liquid ejected on the surface of the recording medium (Claims 1 and 2). Alternatively, the claims recite that the reaction liquid has a surface tension higher than that of the pigment ink and the pigment ink is ejected to the recording medium in such a manner that the pigment ink is brought into contact with the reaction liquid present in a liquid state on the surface of the recording medium (Claims 3 and 4), or a pigment ink contains a surfactant in a higher content than that of the reaction liquid and the pigment ink is brought into contact with the reaction

liquid present on the surface of the recording medium (Claims 5 and 6). Further, certain claims recite that the pigment ink has a surface tension lower than that of the reaction liquid and the reaction liquid is brought into contact with the pigment ink on the surface of the recording medium (Claims 7 and 8), or the pigment ink contains a surfactant in a higher content than that in the reaction liquid and the pigment ink is ejected to the recording medium in such a manner that the pigment ink is brought into contact with the reaction liquid present in a liquid state on the surface of the recording medium (Claims 9 and 10). Further, each claim recites that the recording duty of the reaction liquid satisfies the formula

$$55 \times \frac{0.85 \times 10^6 \times Vd(pl)^{-0.61}}{Rx(dpi)Ry(dpi)} \leq duty(\%) \leq 125 \times \frac{0.85 \times 10^6 \times Vd(pl)^{-0.61}}{Rx(dpi)Ry(dpi)} .$$

With the above arrangements and methods, the drawbacks caused by applying too much reaction liquid (as described in the specification beginning at page 31, line 11) or applying an insufficient amount of reaction liquid (page 32, line 1) can be prevented. For example, when bringing a pigment ink having a lower surface tension into contact with the reaction liquid on a recording medium, pigment agglomerates can migrate on the surface of the reaction liquid, to cause bleeding. With the present invention, however, because the recording duty of the reaction liquid can be applied within an appropriate range as defined by the formula, an excess amount of reaction liquid is prevented.

Takemoto et al. relates to an ink jet recording method using a reaction solution and an ink composition. The reaction solution includes a polyvalent metal salt and the ink composition comprises a pigment and a resin emulsion. However, Takemoto et al. does not disclose or suggest that the pigment has a surface tension lower than that of the reaction liquid. At column 2, lines 22-30, the upper limit of the surface tension for the colorant (40-55 mN/m) is higher than the upper limit of the surface tension of the reaction solution (35 mN/m). Further, as recognized by the Examiner, Takemoto et al. also does not disclose or suggest the formula regarding the recording duty of the reaction liquid, recited in the independent claims.

Thus, Takemoto et al. fails to disclose or suggest important features of the present invention recited in the independent claims.

Kaneko et al. is directed to an ink jet recording head and apparatus. The structural arrangement of the nozzles of the recording head are discussed at paragraphs [0151] - [0153]. Paragraph [0171] discusses temperature increases in two recording element chips recording at different duties. Although Kaneko et al. may disclose specific values for the resolution of the nozzles, ejection amounts, and printing duties, there is no discussion of reaction liquids. Even assuming, *arguendo*, that the recording heads in Kaneko et al. were used to eject reaction liquids, there is no disclosure or suggestion that the recording duty of the reaction liquid would fall within the range of the formula recited

in each of the independent claims. The features of the present invention are not disclosed or suggested by any combination of Takemoto et al. and Kaneko et al.

Koitabashi et al. is directed to an ink jet printing method. A pigment ink and a treatment liquid are utilized and mixed in a liquid state on the printing medium. However, Koitabashi et al. also does not disclose or suggest the formula regarding the recording duty of the reaction liquid recited in the independent claims. For similar reasons as discussed above, any combination of Koitabashi et al. and Kaneko et al. also cannot resolve this deficiency.

Thus, independent Claims 1-10 are patentable over the citations of record. Reconsideration and withdrawal of the § 103 rejections are respectfully requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action, and an early Notice of Allowability are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark A. Williamson", written over a horizontal line.

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